Borax
Big Pharma's Latest Ploy to Outlaw a Natural Cure for Arthritis, Osteoporosis and Tooth Decay

[Editor's Note: We should all be grateful to ZS Livingstone for bringing this important article to my attention. ZS read this in the latest issue of Nexus magazine and sent me an e-mail about it on June 15. I couldn't put it up right away due to a computer failure and the need for a replacement, but I'm glad to be able to post it today. You will understand my enthusiasm after you read the article. You will discover that one can safely ingest a small quantity of Borax dissolved in water and supplement your body with an adequate amount of an *organic* (absorbable) form of **boron**, which will both *prevent* and *overcome* most forms of **arthritis**, **osteoporosis** (bone loss and the thinning of bone density), and reverse the loosening, falling out, and **decay of teeth**, especially in older people. In addition to helping the body keep your calcium inside your bones where it belongs, Borax supplementation can displace fluoride *out* of your body (where it doesn't belong). Other advantages of organic boron supplementation are explained in the article....Ken Adachi]

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The Borax Conspiracy: Big Pharma's Latest Ploy to Outlaw a Natural Cure for Arthritis, Osteoporosis and Tooth Decay (July 6, 2012)

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You may not be able to imagine that Borax, this humble insecticide and laundry detergent, has the potential of singlehandedly bringing down our entire economic system. But you do not need to worry, the danger has been recognised and the necessary steps are already being taken to defuse the situation. I will start with the basics and you will understand what I mean as the story unfolds.

Borax is a naturally occurring and mined mineral salt and the source of other manufactured boron compounds. The main deposits are in Turkey and California. Chemical names are 1) **sodium tetraborate decahydrate**, 2) **disodium tetraborate decahydrate**, or simply 3) **sodium borate**.

This means it contains **four atoms** of **boron** as its central feature combined with two sodium atoms and ten molecules (or sometimes less) of crystallisation water. Therefore, borax is the sodium salt of the weak boric acid. Because sodium is more strongly alkaline, this makes a solution of borax strongly alkaline with a pH between 9 and 10 (pH 7 is neutral). When ingested, it reacts with hydrochloric acid in the stomach to form **boric acid** and sodium chloride (table salt). The boron content of Borax is 11.3% while for boric acid it is 17.5% or about 50% higher. Ingested boron compounds are rapidly and nearly completely excreted with the urine.

Formerly, boric acid was widely used as a preservative in foods, but is now **banned** for this purpose in most countries, and is also banned from public sale in **Australia**.

According to conventional medicine, it is not known if boron is essential for humans, but research shows that we do need it. The reason why it was difficult to answer this question is the presence of boron in all plants and unprocessed foods. Diets with a fair amount of fruit and vegetables provide about 2 to 5 mg of boron per day, but this also depends on the region where the food was grown and how it was grown.

In reality the average intake in developed countries is 1-2 mg of boron per day. Institutionalized patients may receive only 0.25 mg of daily boron. Chemical fertilizers inhibit the uptake of boron from the soil: an organic apple grown in good soil may have 20 mg boron, but if grown with fertilizer it may have only 1 mg of boron. Fertilizers combined with poor food choices have greatly reduced our boron intake compared to 50 or 100 years ago.

Further, unhealthy cooking methods greatly reduce the availability of boron from food. The cooking water of vegetables containing most of the minerals may be discarded during home cooking or commercial processing; **phytic acid** in baked goods, cereals and cooked legumes may greatly reduce availability, while gluten sensitivity and Candida overgrowth inhibit the absorption of minerals. All this makes health problems due to boron deficiency now very common.

Health Effects of Boron

Due to their content of boron, borax and boric acid have basically the same health effects, with good antiseptic, antifungal, and antiviral properties, but only mild antibacterial action. In plants as well as animals, boron is essential for the integrity and function of **cell walls**, and the way signals are transmitted across membranes.

Boron is distributed throughout the body with the **highest concentration in the parathyroid glands**, followed by **bones** and **dental enamel**. It is essential for healthy bone and joint function, regulating the absorption and metabolism of calcium, magnesium and phosphorus through its influence on the parathyroid glands. With this, boron is for the parathyroids what iodine is for the thyroid.

Boron deficiency causes the parathyroids to become **overactiv**e, releasing too much parathyroid hormone *which raises the blood level of calcium by releasing calcium from bones and teeth*. This then leads to **osteoarthritis** and other forms of arthritis, **osteoporosis** and **tooth decay**. With advancing age, high blood levels of calcium lead to *calcification of soft tissues* causing muscle contractions and stiffness; **calcification** of endocrine glands, especially the **pineal gland** and the **ovaries**; arteriosclerosis, kidney stone**s**, and calcification of the **kidneys** ultimately leading to kidney failure. Boron deficiency combined with magnesium deficiency is especially damaging to the bones and teeth.

Boron affects the metabolism of steroid hormones, and especially of sex hormones. It increases low testosterone levels in men and oestrogen levels in menopausal women. It also has a role in converting vitamin D to its active form, thus increasing calcium uptake and deposition into bone and teeth rather than causing soft tissue to calcify. Also other beneficial effects have been reported such as improvement of heart problems, vision, psoriasis, balance, memory and cognition.

The German cancer researcher Dr Paul-Gerhard Seeger has shown that cancer commonly starts with the deterioration of cell membranes. As boron is essential for cell membranes and boron deficiency widespread, this may be an important cause for the initiation of tumour growth. Boron compounds have anti-tumour properties and are "potent anti-osteoporotic, anti-inflammatory, hypolipemic, anti-coagulant and anti-neoplastic agents" (1).

This overview shows the wide-ranging influence of boron on our health. In the following I want to describe some of these health effects in greater detail.

The Arthritis Cure of Rex Newnham

In the 1960's, Rex Newnham, Ph.D., D.O., N.D, developed arthritis. At that time he was a soil and plant scientist in Perth, Western Australia. Conventional drugs did not help, so he looked for the cause into the chemistry of plants. He realized that plants in that area were rather mineral deficient. Knowing that boron aids calcium metabolism in plants he decided to try it. He started taking 30 mg of borax a day, and in three weeks all pain, swelling and stiffness had disappeared.

He told public health and medical school authorities about his discovery, but they were not interested. However, some people with arthritis were delighted as they improved. Others were scared to take something with a poison label on the container and meant to kill cockroaches and ants. Eventually, he had tablets made with a safe and effective quantity of borax.

Within five years and only by word of mouth he sold 10,000 bottles a month. He could no longer cope and asked a drug company to market it. That was a major mistake. They indicated that this would replace more expensive drugs and reduce their profits. It so happened that they had representatives on government health committees and arranged that in 1981, Australia instituted a regulation that declared boron and its compounds to be poisons in any concentration. He was fined $1000 for selling a poison, and this successfully stopped his arthritis cure from spreading in Australia. (2)

Subsequently he published several scientific papers on borax and arthritis. One was a double-blind trial in the mid 1980's at the Royal Melbourne Hospital which showed that 70% of those who completed the trial were greatly improved. Only 12% improved when on placebo. There were no negative side-effects, but some reported that their heart ailment had also improved, and there was better general health and less tiredness. (3)

Most of his later research was devoted to the relationship between soil boron levels and arthritis. He found, for instance that the traditional sugarcane islands, *due to long-term heavy use of fertilizers*, have **very low soil-boron levels**. **Jamaica** has the lowest level and arthritis rates are about **70%**. He noted that even most dogs were limping. Next comes **Mauritius** with very low boron levels and **50% arthritis**. The daily boron intake in these countries is **less than 1 mg/day**. An interesting comparison is between **Indian** and native **Fijians**. The Indians are estimated to have an arthritis rate of about **40%** and eat much rice grown with fertilizer while the native Fijians with an estimated arthritis rate of **10%** eat mainly starchy root vegetables grown privately without fertilizer.

The US, England, Australia and New Zealand generally have average soil-boron levels with an estimated intake of 1 to 2 mg of boron and arthritis rates of about 20%. But **Carnarvon** in Western Australia has**high boron levels in soil** and water, and the arthritis rate is only **1%**. It is similar in a place called Ngawha Springs in New Zealand with very high boron levels in the spa water which is curative for arthritis. Actually **all spas reputedly curing arthritis have very high boron levels**. These are also high in Israel with an estimated daily boron intake of 5 to 8 mg and only 0.5 - 1% arthritis.

Bone analysis showed that arthritic joints and nearby bones had only half the boron content of healthy joints. Equally, **synovial fluid** that lubricates joints and provides nutrients to the cartilage is boron deficient in arthritic joints. After boron supplementation, bones were much harder than normal and surgeons found them more difficult to saw through. **With additional boron, bone fractures heal in about half the normal time in both man and animal**. Horses and dogs with broken legs, or even a broken pelvis, have fully recovered.

Borax is also effective with other forms of arthritis, such as **Rheumatoid Arthritis**, **Juvenile Arthritis**, and **Lupus** (Systemic Lupus Erythematosus). For instance Dr Newnham saw a young girl aged 9 months with juvenile arthritis. He was able to cure her in **2 weeks**.

He wrote that people can commonly get rid of their pain, swelling and stiffness in about 1 to 3 months. Then they can reduce treatment from 3 to 1 boron tablet (each 3 mg) per day as a maintenance dose so that they can avoid any future arthritis. He also stated that patients with rheumatoid arthritis commonly experienced a **Herxheimer reaction** [healing reaction],and that this is always a good prognostic sign. They must persevere and in another 2 or 3 weeks the pain, swelling and stiffness will be gone. (4,5)

I found this statement not only interesting, but also surprising. The Herxheimer reaction is an early aggravation of symptoms with increased pain. It is commonly due to toxins released by **killed Candida** and**mycoplasma**. This is very common with antimicrobial therapy, and borax definitely is an **exceptionally good** and strong **fungicide**. What surprises me, however, is that this fungicidal effect is already present at this rather low dose of 75 to 90 mg of borax. Equally surprising is the finding that also up to 30% of those with osteoarthritis experienced a Herxheimer reaction, suggesting that the border between osteoarthritis and rheumatoid arthritis is rather fluid. I believe that in long-standing and especially resistant cases it will be advisable to use other antimicrobials in addition. For co-factors in arthritis treatment also see my article Arthritis and Rheumatism or the booklet OVERCOMING ARTHRITIS.

Osteoporosis and Sex Hormones

Boron deficiency causes greatly increased amounts of calcium and magnesium to be lost with the urine. A borax supplement will reduce the daily loss of calcium by nearly 50%. As this calcium comes mainly from resorbed bone and teeth, **boron deficiency may be the most important factor in causing osteoporosis and tooth decay.**

It has been estimated that 55% of Americans over 50 have osteoporosis and of these about 80% are women. Worldwide, 1 in 3 women and 1 in 12 men over the age of 50 may have osteoporosis, and this is responsible for millions of fractures each year. Rats with osteoporosis were given a boron supplement for **30 days** with the result that their bone quality was now comparable with that of the healthy control group and of a group supplemented with oestradiol (6).

The beneficial effect of borax on bones seems to be due to two interrelated effects: a **higher boron content** of the bones which **makes them harder**, and a **normalisation of sex hormones** which stimulates the **growth** of **new bone**. Low oestrogen levels after menopause are thought to be the main reason why so many older women develop osteoporosis. In men, testosterone levels decline more gradually which seems to be reflected in their later onset of osteoporosis as a group.

Research has now shown that boron supplementation in postmenopausal women doubles the blood level of the most active form of oestrogen, 17-beta oestradiol, to the level found in women on oestrogen replacement therapy. Equally, the blood levels of testosterone more than doubled (7). With HRT [hormone replacement therapy] there is a higher risk of breast or endometrial cancer which is not known to happen with hormones produced by the body as with borax supplementation.

Some women get premenstrual problems because oestrogen levels are too high and progesterone too low, and therefore may be afraid of using boron. However, I found no evidence that boron raises oestrogen above normal healthy levels. Boron may balance levels of sex hormones similar to the action of maca root powder. Maca acts on the pituitary gland not only to increase, but also to balance our sex hormones and seems to stimulate our own progesterone production as needed.

A recent study in younger men (29 - 50) showed that the level of free testosterone (the form that matters most) had risen by one third after a daily supplementation of about 100 mg of borax for one week (8). This is of special interest for bodybuilders.

Contrary to the medical preference of chemically castrating men with prostate cancer, research with **boron has shown** that elevated testosterone levels are **beneficial** by **shrinking prostate tumours** and **PSA levels**, PSA [prostate specific antigen] being a marker for tumours and inflammation in the prostate. Also, significantly **improved memory** and **cognition** in **elderly individuals** may be partly due to increased levels of sex hormones and partly to improved membrane functions of brain cells (9).

I have been asked about boron supplementation for women with oestrogen-sensitive breast cancer. **Breast cancer** is related to **calcifications in the breast**. In my opinion, it is more important to normalize the calcium-magnesium metabolism and cellular membrane functions rather than feel restricted by a possibly faulty medical concept, especially as I believe that cancer can usually be controlled with long-term antimicrobial therapy. Therefore I would use boron as well as maca in this case.

Fungi and Fluoride

Being such an excellent fungicide, it is not surprising that borax is being successfully used to **treat Candida**. There is much interesting information on an Earth Clinic forum called Borax Cures (10). With low to medium-weight people use 1/8 teaspoon of borax powder and with heavier weight 1/4 teaspoon per litre of water. One drinks the water spaced out during the day, and does this for 4 or 5 days a week as long as required.

Many contributors wrote that it cured or greatly helped them. So for instance this post: "I also have psoriasis, so maybe the soreness in my joints is the psoriatic arthritis creeping in. I thought, after reading about borax here on this forum, I would give it a try. OMG! In one day, the soreness in my knees has vanished! .... Also, my psoriasis seems a lot better after 2 days drinking 1/4 tsp borax in 1 litre of water per day."

Another one about toe fungus: "He wet his feet and then took a handful (of borax) and rubbed it all over his feet. He said it stopped itching immediately! He was stunned. A few weeks later I asked him how his athletes foot was and he said: oh wow! it hasn't come back! that stuff totally cured it !!!"

Other enthusiastic posts were about vaginal thrush [candida]. Borax appeared to be more effective than other remedies. Commonly, one large gelatine capsule filled with borax or boric acid was inserted at bedtime for several nights or up to 2 weeks. Alternatively the powder can be mixed with cool solidified coconut oil as a bolus or suppository.

A recent scientific study (11) confirms these positive observations with vaginal thrush. Boric acid at the dose of a filled capsule worked even in cases of drug-resistant Candida and against all the tested pathogenic bacteria. Because of the greater dilution, a douche may not be strong enough for bacteria and drug-resistant Candida, but it should work for normal Candida. Borax, due to its alkalinity, was more effective than boric acid.

In normal healthy conditions, Candida exists as harmless oval yeast cells. When challenged, chains of elongated cells called **pseudohyphae** develop, and finally strongly invasive long, narrow and tube-like filaments called **hyphae**. These damage the intestinal wall, and cause inflammation and **Leaky Gut Syndrome**.

Pseudohyphae and hyphae can be seen in the blood of individuals with cancer and autoimmune diseases. Candida can also form tough layers of **biofilm**. This same study shows that boric acid/borax inhibits the formation of biofilms and also the transformation of harmless yeast cells into invasive hyphal form. In other articles, I have shown that this process, *commonly initiated by antibiotics*, is a basic cause of most of our modern diseases, and this makes borax and boric acid primary health remedies. But this article shows that there are many more reasons to give them a top rating.

A scientific review in 2011 concluded: "... boric acid is a safe, alternative, economic option for women with recurrent and chronic symptoms of vaginitis when conventional treatment fails..." (12). But as it is so much better than drugs, why not use it as a first option, or use the even more effective borax?

Another study from Turkey (13) shows the **protective effect** of boric acid on food contaminated with **mycotoxins**, especially **fungal aflatoxins**. Among these, **Aflatoxin B1** (AFB1) causes extensive **DNA damage** and is the most potent carcinogen ever tested, especially affecting liver and lungs, also causing birth defects, immunotoxicity and even death in farm animals and humans.

Boric acid treatment was protective and led to increased resistance of DNA to oxidative damage induced by AFB1. The strong antifungal action of boric acid is, of course, the reason why it has traditionally been used as a food preservative.

Borax, similar to the equally endangered **Lugol's iodine solution**, can also be used to **remove** accumulated **fluoride** and **heavy metals** from the body (14). Fluoride not only causes bones to deteriorate, but also the **pineal gland** to **calcify** and the **thyroid** to **become underactive**. Borax reacts with fluoride ions to form **boron fluorides** which are then **excreted** in the urine.

In a Chinese study, borax was used to treat 31 patients with skeletal fluorosis. The amount was gradually increased from 300 to 1100 mg/day during a three month period, with one week off each month. The treatment was effective with 50 to 80% improvement.

One forum contributor suffered with Fibromyalgia/Rosacea, chronic fatigue and TMJ for over 10 years which she believed were caused by fluoride. She used 1/8 tsp of borax and 1/8 tsp of sea salt in a litre of de-chlorinated water, and drank this for 5 days each week. Within two weeks her face cleared, the redness faded, body temperature normalized, energy level increased, and she steadily lost excess weight. The only side-effect was an initial aggravation of her Rosacea symptoms.

Another post: "7 years ago thyroid cancer, the next year adrenal fatigue, then early menopause, the following year uterine prolapse followed by hysterectomy - the following year fibromyalgia and neuropathy. Early Childhood was fluorinated water along with fluoride tablets. Fall of 2008 I was looking at total disability. I could barely walk and couldn't sleep because of the pain and was throwing up daily from the pain in my back. ... After reading about fluoride I came to understand where all of my problems originated. ... I began the borax detox of 1/8 tsp in a litre of water and within 3 days my symptoms were almost gone."

Calcium-Magnesium Metabolism

There is antagonism as well as cooperation between calcium and magnesium. About half of the total body magnesium is found in bones and the other half inside the cells of tissues and organs. Only 1% is in the blood. The kidneys try to keep this level constant by excreting more or less with the urine.

In contrast, 99% of calcium is in bones, and the rest in the fluid outside of cells. Muscles contract when calcium moves into the cells, and they relax when calcium is again pumped out and magnesium moves in. This cellular pump requires much energy to pump calcium out, and if cells are low in energy, then calcium may accumulate inside cells. Low cellular energy may be due to Candida, faulty sugar or fat metabolism, deficiencies, or accumulating metabolic wastes and toxins.

This then leads to only partial relaxation of the muscles with stiffness, a tendency to **cramps**, and poor blood and lymph circulation. The problem gets worse the more calcium moves from bones into soft tissue. Nerve cells can also accumulate calcium, leading to faulty nerve transmission. In

the eye lens, it causes cataracts. Hormonal output keeps reducing as endocrine glands increasingly calcify and all other cells become handicapped in their normal functions. In addition, it causes intracellular magnesium deficiency. Magnesium is needed to activate countless enzymes, and a deficiency leads to inefficient and blocked energy production.

A further problem is that excess calcium damages the cell membrane and makes it difficult for nutrients to move in and wastes to move out. When the intracellular calcium level gets too high, the cell will die.

Here we can see the importance of boron as a regulator of cell membrane functions, especially in regard to movements of calcium and magnesium. With boron deficiency, too much calcium moves into the cell while magnesium cannot move inside to displace it. This is the condition of old age and of the boron-deficiency diseases leading up to it.

While in good health and especially in younger years, a calcium - magnesium ratio of 2 : 1 is normal and beneficial and supplied with a good diet. But with increasing age, boron deficiency and resulting disease conditions, we need progressively less calcium and more magnesium.

For boron to be fully effective in reversing tissue calcification, ample magnesium is required. For elderly individuals, I recommend **400 to 600 mg of magnesium** together **with the daily borax supplementation spaced out during the day**, and with protracted joint problems additional trans-dermal magnesium. However, oral magnesium may need to be adjusted according to its laxative effect. I am doubtful **whether calcium supplements are needed and beneficial**, even in case of osteoporosis. In my view these individuals have plenty of calcium stored in soft tissues where it does not belong, and supplementing boron and magnesium is expected to redeposit this misplaced calcium into bones. I regard the medical focus on a high calcium intake as a prescription for accelerated aging.

What and How Much to Use

In some countries (e.g. Australia, NZ, USA), borax can still be found in the laundry and cleaning sections of supermarkets. There is no "food-grade" borax available or necessary. The label usually states that it is 99% pure which is safe to use, and is the legal standard for agricultural grade borax. Up to 1% mining and refining residues are permitted. Boric acid, if available, may be used at about the dose of borax.

Firstly, dissolve a lightly rounded teaspoonful (5-6 grams) of borax in 1 litre of good quality water free of chlorine and fluoride. This is your concentrated solution. Keep the bottle out of reach of small children.

· Standard dose = 1 teaspoon (5 ml) of concentrate. This has 25 to 30 mg of borax and provides about 3 mg of boron. Take 1 dose per day mixed with drink or food. If that feels right then take a second dose with another meal. If there is no specific health problem or as a maintenance dose you may continue indefinitely with 1 or 2 doses daily.

If you do have a problem, such as arthritis, osteoporosis and related conditions, menopause, stiffness due to advancing years, and also to improve low sex hormone production, increase intake to 3 or more spaced-out standard doses for several months or longer until you feel that your problem has sufficiently improved. Then drop back to 1 or 2 doses per day.

If you want to try the higher doses recommended by Earth Clinic for treating Candida and removing fluoride from the body - using your bottle of concentrated solution - then use:

· Lower dose for low to normal weight - 100 ml (= 1/8 teaspoon of borax powder); drink spaced out during the day.

· Higher dose for heavier individuals - 200 ml (= 1/4 teaspoon of borax powder); drink spaced out during the day.

Always start with a standard dose and increase gradually to the intended maximum. Take the maximum amounts for 4 or 5 days a week as long as required.

Borax is rather alkaline and in higher concentrations has a soapy taste. You may disguise this with lemon juice, vinegar or ascorbic acid. Keep the bottle with the concentrated solution out of reach of small children.

Borax and boric acid have been classified as reproductive poisons in Europe, and since December 2010 are no longer available to the public within the EU.

Presently, borax is still available in Switzerland (15), but shipment to Germany is not permitted. In Germany a small amount (20 - 50 grams) may be ordered through a pharmacy as ant poison (it will be registered).

Boron tablets can be bought from health shops or the Internet, commonly with 3 mg of boron. These contain **tightly bound boron not present** in **ionic form** as with borax or boric acid. While suitable as a general boron supplement, I do not expect them to work against Candida and mycoplasmas, or as a quick arthritis, osteoporosis or menopause cure. Most scientific studies and individual experiences were with borax or boric acid. To improve effectiveness, I recommend 3 or more spaced-out boron tablets daily for an extended period combined with sufficient magnesium and a suitable antimicrobial program (16).

Possible Side-Effects

While side-effects from pharmaceutical drugs tend to be negative and often dangerous, with natural medicine, such as borax therapy, these are usually healing reactions with beneficial long-term effects. Most common is the Herxheimer reaction from eliminating Candida.

In some of the above forum posts, rapid improvement was experienced within days. This is always a functional response. High **cellular calcium** levels cause **muscle contraction** with cramps or spasms as a common cause of pain. **Boron**, especially together with **magnesium**, can rapidly relax these muscles and *take away the pain*.

However, with long-standing severe calcifications a large amount of calcium cannot be redistributed in a short time. This leads to increased calcium levels in the affected area, especially the hips and shoulders, and can cause problems for a considerable time, such as a tendency to severe cramping and pain, or problems with the blood circulation, or nerve transmission. Nerve-related effects in hands and feet may be numbness, or reduced sensitivity or feeling in the skin. Higher amounts of calcium and fluoride passing through the kidneys may cause temporary kidney pain. Such healing reactions cannot be avoided when aiming for a higher level of health.

Whenever you experience an unpleasant effect **reduce or temporarily stop borax intake until the problem subsides**. Then gradually start increasing again. Helpful additional measures are a) a greatly increased fluid intake, b) using more organic acids such as lemon juice, ascorbic acid or vinegar, and c) improving lymph flow as with rebounding, walking or inverted positions.

Toxicity Issues

Government health agencies are concerned about boron toxicity. You might be concerned as well if you read the following, pertaining to **sodium chloride** (or more commonly known as **table salt** (17):

'Acute oral toxicity (LD50 - the dose at which half of the tested animals die): 3,000 mg/kg [Rat]. Chronic Effects on Humans: Mutagenic for mammalian somatic cells. Slightly hazardous in case of skin contact, ingestion or inhalation. Lowest Published Lethal Oral Dose in Man: 1000 mg/kg. Causes adverse reproductive effects in humans (fetotoxicity, abortion) by intraplacental route, may increase risk of Toxemia of Pregnancy in susceptible women. May cause adverse reproductive effects and birth defects in animals, particularly rats and mice - fetotoxicity, abortion, musculoskeletal abnormalities, and maternal effects (on ovaries, fallopian tubes). May affect genetic material (mutagenic). Ingestion of large quantities can irritate the stomach with nausea and vomiting. May affect behavior (muscle spasicity/contraction, somnolence), sense organs, metabolism, and cardiovascular system. Continued exposure may produce dehydration, internal organ congestion, and coma.'

Now compare the sodium chloride toxicity with the Material Safety Data Sheet or MSDS for **borax** (18):

'Low acute oral toxicity; LD50 in rats 4,500 to 6,000 mg/kg of body weight. Reproductive/developmental toxicity: Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes. Studies with boric acid in the rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations. The doses administered were many times in excess of those to which humans would normally be exposed. No evidence of carcinogenicity in mice. No mutagenic activity was observed in a battery of short-term mutagenicity assays. Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to borate dust and no effect on fertility.'

Here you see that table salt is 50 to 100% **more toxic** than borax. Table salt changes the genetic material and is mutagenic, while borax is harmless in this regard. Infants are most at risk from high borax ingestion. It has been estimated that 5 to 10 grams can cause severe vomiting, diarrhoea, shock and even death, but it also says that lethal doses are not well documented in the literature.

The following toxicity data are from documents of the US Environmental Protection Agency and the Centers for Disease Control (19, 20).

A review of 784 accidental human poisonings from 10 - 88 grams of boric acid reported no fatalities, with 88% of cases being asymptomatic, meaning they did not notice anything. However, gastrointestinal, cardiovascular, hepatic, renal, and central nervous system effects, dermatitis, erythema, and death have been observed in some children and adults exposed to more than 84 mg boron/kg, corresponding to more than 40 grams of borax for 60 kg of body weight.

Animal studies have identified reproductive toxicity as the most sensitive effects of boron ingestion. Exposure of rats, mice, and dogs for several weeks showed some damage to the testes and sperm at doses of more than 26 mg boron/kg which corresponds to 15 grams of borax/day for 60 kg body weight.

Most at risk is the developing foetus, and in the studied animals rats were most affected. In one study slight reductions in the foetal body weight were already found at 13.7 mg boron/kg/day used during pregnancy. The **[has] no effect dose** was set at less than 13.7 mg/kg/day corresponding to about **7 grams of borax per day for 60 kg body weight**. With an *added safety factor*, a no effect value of 9.6 mg boron/kg/day was calculated corresponding to **5 grams of borax for 60 kg**.

However, a rat study lasting for 3 generations found no reproductive toxicity or effect on the parents or offspring at 30 mg boron/kg/day. This dose corresponds to 17 grams of borax for 60 kg ingested for 3 generations! In another 3-generation study no problem was found at 17.5 mg boron/kg/day, corresponding to 9 grams of borax/60 kg, while the next higher tested dose of 58.5

mg/kg/day, corresponding to 30 grams of borax/60 kg, resulted in infertility. Therefore we can assume that the **safe reproductive dose** is **up to about 20 grams/60 kg/day**.

Human studies of the possible association between impaired fertility and high boron levels in water, soil and dust in a Turkish populations, and boron mining and processing workers, **found no effect**. One study even reported elevated fertility rates in borax production workers as compared to the U.S. national average.

All this is important because possible reproductive toxicity is the official reason for the present assault on borax. The sodium chloride MSDS mentioned above also states: "*While sodium chloride has been used as a negative control in some reproductive studies, it has also been used as an example that almost any chemical can cause birth defects in experimental animals if studied under the right conditions.*" Keep this in mind when you read the following.

The Assault on Borax

Arthritis in its various forms and its close relative osteoporosis affect about 30% of the population in developed countries. **Osteoporosis** is responsible for more long term hospital care than any other individual disease. This is due to the very high incidence of fractures, and especially the protracted nature of hip fractures. *This is a main source of income for the medical-pharmaceutical system*. If the boron-magnesium cure for these diseases should become widely known, this vital income stream would dry up and the system collapse. As this is the biggest and most profitable industry in the world, this cannot be allowed to happen.

When Dr Newnham discovered the boron-arthritis cure, it was not a big problem for the pharmaceuticals because news travelled slowly and was easily suppressed. This is very different now with Internet communication. Most research funding comes from the pharmaceutical industry, and nothing has come forward to duplicate Dr Newnham's findings and other positive osteoporosis studies. Instead, funding goes into the development of patentable boron drugs for limited application as in chemotherapy, or even to discredit boron. A test-tube experiment found that a relatively low dose of about 4 grams of borax can damage lymphocytes, just like an earlier test-tube study showed that vitamin C supplements are toxic. Most positive borax studies now come from China, Japan and Turkey.

Furthermore, **PubMed** is a publicly funded search facility for bio-medical research publications. While other articles for Newnham R.E. and Zhou L.Y. are still listed, the two important borax publications mentioned earlier - about the arthritis trial at the Royal Melbourne Hospital and the treatment of skeletal fluorosis in China - are no longer listed, but they belong there and obviously had been there originally. I suspect that they have been deliberately removed to prevent them from being quoted in other research.

In addition, increasing effort goes into **publicly demonizing borax** for its alleged reproductive and infant toxicity. As an example, I recently read an article by a 'senior scientist' of the supposedly 'green' Environmental Working Group. In it, the perceived dangers of borax were so exaggerated that most comments in effect said: "*Thank you for opening my eyes. I did not know how poisonous and dangerous borax is, I certainly will not use it anymore in my laundry, or for cleaning my toilet and kitchen*".

This is obviously a deliberate campaign to make people grateful for banning borax from public sale. For laundry and cleaning purposes Borax Substitute now replaces the product previously sold as Borax. **The EU has spearheaded this campaign**. In June 2010, borax and boric acid were reclassified as "Reprotoxic Category 2", suggesting that they may be harmful to the reproductive functions of humans in high doses, and the product **package must display the skull and crossbones symbol**. From December 2010, these products were no longer available for public sale within the EU. While this classification now applies for all of Europe, non-EU countries still have some leeway in regard to public sales. This initiative is part of a **Globally Harmonized System of**

Classification and Labelling of Chemicals (GHS)which is to be implemented as soon as possible. Australia is well-advanced on preparing regulations to implement the GHS for industrial chemicals, with new regulations expected in 2012 (21).

The European Chemicals Agency gave as reason for their reclassification of boron products (paraphrased):

'The available data do not indicate major differences between laboratory animals and humans, therefore it must be assumed that the effects seen in animals could occur in humans as epidemiological studies in humans are insufficient to demonstrate the absence of an adverse effect of inorganic borates on fertility. 17.5 mg boron/kg/day was derived as a NOAEL (no event level) for male and female fertility. For the rat decreased foetal weight occurred at 13.7 mg boron/kg/day, and a safe limit of 9.6 mg/kg/day has been derived.' (22)

What they are really saying is this: 'While we have no human data, **animal studies** *suggest* that for adult reproductive functions a daily ingestion of about **2 teaspoons of borax is safe**. But to be absolutely sure that no-one is harmed, we will ban it totally.' Importantly, this ruling is not related to borax in foods or supplements where it is already banned, but only for general use as in laundry or cleaning products or as insecticides. Because borax is not readily inhaled or absorbed through intact skin, it is difficult to see how even a few milligrams daily could get into the body with the conventional use. If the same standard would apply to other chemicals, there would be none left.

The key study in this assessment was published in 1972. *Why is this being dug up now to justify banning borax when it was of no concern for the past 40 years?* It does not make any scientific sense, especially if you consider that the main chemical in the **new borax substitute**, sodium percarbonate, is about **three times more toxic than borax**. Acute oral LD50 values for animals are from 1034 to 2200 mg/kg/day (23). Even the commonly used **sodium bicarbonate**, with an animal LD50 of 3360 mg/kg, is nearly **twice as toxic as borax** (24). Both of these chemicals have not been tested for long-term reproductive toxicity at the high doses that caused fertility problems in rats and mice.

The same applies to washing powders [**laundry detergents**], it has been stated that no toxicity is expected if used in the approved way, or that reproductive tests have not been done. Ingredients in these products **are more toxic than borax**, why can they be used in the approved way but not borax? And how about really toxic items such as caustic soda and hydrochloric acid? Why do they remain available to the public when one of the safest household chemicals is banned despite the fact that it is absolutely impossible to cause any reproductive harm with the approved use?

Regardless of the lack of any scientific credibility, t**he stage has been set for borax and boric acid to be globally removed from public sale** at short or no notice. Even low-level and less effective boron tablets are now tightly controlled by the pharmaceutical industry, and may be restricted at any time through **Codex Alimentarius** regulations. With this, the medical-pharmaceutical system has safely defused any potential danger that borax may have posed to its profitability and survival.

Walter Last

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